

AUTOTRENDS

The following article presents a view of future trends in lubrication as perceived by Paramins at their recent Autotrends 98 seminar in London.

They focused on three dominant issues i.e. fuel economy, cost of ownership and driver convenience.

As ever, future trends are driven mainly by legislation, notably those concerning exhaust emissions.

CARBON DIOXIDE EMISSIONS

Despite the proactive line of the European Union taken to meet the requirements agreed at the Kyoto conference in 1997, the European Commission are not satisfied with the steps so far taken. In December 1997, the Environment Council urged the Commission to propose a Directive with binding reduction goals, with a CO₂ fleet average of 120g/km by 2008 being suggested as a target. In March, the motor industry responded with an offer of 140 g/km, but only if there were no unreasonable restrictions on diesel vehicles, if there was full availability of low sulphur fuel by 2005, and if there was a full availability of fuels with appropriate fuel economy features such as cetane numbers. This offer has received a sympathetic hearing, and the Environment Council have asked the Commission to start work on the technical details.

VEHICLE EMISSIONS AND FUEL SPECIFICATIONS

Consensus on passenger car emissions and fuel quality for 2000 has almost been reached between the Council of Ministers and the European Parliament although there are still significant differences in the areas of diesel sulphur and the gasoline aromatics contents as is shown in Table 1. The 2005 proposals, which are much tougher on diesel passenger cars compared with gasoline proposals, as shown in Table 2,

and are likely to go to 'conciliation'.

The current and proposed emission limits for the various groups of vehicles are shown in Table 3.

It is understood that the 2005 emissions and fuel specifications may be mandated now but may be reviewed at a later stage after the year 2000. There are also European proposals for new emission limits for heavy duty diesels for 2000, for which two new test procedures have been developed to reflect real world conditions, namely a steady state cycle with a dynamic smoke test (ESC/ELR) for conventional engines, and a European transient test (ETC) for engines with advanced aftertreatment such as de-NOx catalysts and/or particulate traps.

VEHICLE ENGINEERING

Probably the most significant development is the **GDI (gasoline direct injection)** engine, which is starting to appear in certain vehicles marketed by Mitsubishi, Toyota and Nissan. Apart from the direct injection of gasoline into the cylinder as opposed to the normal indirect system, the predominant feature of this system is the sophisticated engine management system which, coupled with lean burn air:fuel ratios of as low as 50:1, provide exceptional fuel economy together with acceptable driveability. Introduction into the European market has been delayed by the need to modify catalyst systems to operate with the higher fuel sulphur levels in Europe. Toyota, for example, who use a 'storage and reduction' treatment system as an integral part of their design philosophy, will have a particular problem

TABLE 1

European Fuel Specification Year 2000 Proposals

(Common Position (EC) No 39/97 of 7 October 1997 and European Parliament, 2nd reading February 1998)

Gasoline 2000			Diesel 2000		
Parameters	Common Position	EP 2/98	Parameters	Common Position	EP 2/98
RVP Summer (kPa max)	60	60	Sulphur (mg/kg max)	350	200
RVP (kPa max) Artic grade	70	70	Distillation: 95% point (°C max)	360	360
Sulphur (mg/kg max)	150	150	Polyaromatics (% m/m max)	11	11
Benzene (% v/v max)	1.0	1.0	Cetane number (min)	51	51
Aromatics (% v/v max)	42	35	Density at 15°C	845	845
Olefins (% v/v max)	18	14			
Oxygen Content (% m/m max)	2.3	2.7			
RON (min)	95	95			
MON (min)	85	85			
Evap-100°C (% v/v min)	46	46			
Evap-150°C (% v/v min)	75	75			
Trace lead (g/l max)	0.005	0.005			

TABLE 2

European Fuel Specification Year 2005 Proposals

(Common Position (EC) No 39/97 of 7 October 1997 and European Parliament, 2nd reading February 1998)

Gasoline 2005			Diesel 2005		
Parameters	Common Position*	EP 2/98**	Parameters	Common Position*	EP 2/98**
RVP Summer (kPa max)	n/a	n/a	Sulphur (mg/kg max)	50	50
RVP (kPa max) Artic grade	n/a	n/a	Distillation: 95% point (°C max)	n/a	340
Sulphur (mg/kg max)	50	30	Polyaromatics (% m/m max)	n/a	1
Benzene (% v/v max)	n/a	n/a	Cetane number (min)	n/a	58
Aromatics (% v/v max)	35	30	Density at 15°C	n/a	825
Olefins (% v/v max)	n/a	n/a			
Oxygen Content (% m/m max)	n/a	n/a			
RON (min)	n/a	n/a			
MON (min)	n/a	n/a			
Evap-100°C (% v/v min)	n/a	n/a			
Evap-150°C (% v/v min)	n/a	n/a			
Trace lead (g/l max)	n/a	n/a			

* Indicative
** Mandatory
n/a Not amended

(CONTINUED ON PAGE 11)